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09/997,082	11/28/2001	John Charles Clark	57254US002	6097

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EXAMINER
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PIZIALI, ANDREW T

ART UNIT	PAPER NUMBER
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1771

DATE MAILED: 08/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/997,082  
Filing Date: November 28, 2001  
Appellant(s): CLARK ET AL.

**MAILED**

AUG 08 2005

**GROUP 1700**

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Philip Dahl  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 6/28/2005.

16

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Grounds of Rejection (Issues) to be Reviewed on Appeal***

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) *Claims Appendix***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) *Evidence Appendix***

There is no separate Evidence Appendix for this appeal.

**(9) *Related Proceedings Appendix***

There is no separate Related Proceedings Appendix for this appeal.

Art Unit: 1771

**(10) Prior Art of Record**

6803143	ZUBER	10-2004
3573991	LENFANT	4-1971
4897286	KOSUDA	1-1990
3972735	BREAULT	8-1976

**(11) Grounds of Rejection**

The following grounds of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,803,143 to Zuber et al. (hereinafter referred to as Zuber) in view of any one of USPN 3,573,991 to Lenfant et al. (hereinafter referred to as Lenfant) or USPN 4,897,286 to Kosuda et al. (hereinafter referred to as Kosuda).

Regarding claims 10-19, Zuber discloses a method of making a hydrophobic carbon fiber construction comprising the step of immersing a carbon fiber construction in an aqueous dispersion of highly fluorinated polymer (see the entire document including column 7, lines 19-30).

Although Zuber fails to mention electrophoretically depositing the highly fluorinated polymer on the carbon fiber construction, Lenfant and Kosuda each disclose that it is known to

Art Unit: 1771

contact particles with a counterelectrode and electrophoretically deposit the particles on a carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction (see entire documents including column 3, lines 65-75 of Lenfant and the paragraph bridging columns 5 and 6 of Kosuda). It would have been obvious to one having ordinary skill in the art at the time the invention was made to electrophoretically deposit the highly fluorinated polymer particles on the carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction.

Regarding claims 11, 13 and 19, Zuber discloses that the carbon fiber construction can be sintered (see column 7, lines 19-30 of Zuber).

Regarding claims 12-19, considering that the hydrophobic carbon fiber construction taught by the prior art is made by a method identical to the currently claimed method, it appears that the hydrophobic carbon fiber construction taught by the prior art inherently possesses a monolayer (as defined on page 3, lines 2-6 of the current specification) of particles of highly fluorinated polymer. In the event that it is shown that a monolayer does not exist, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the voltage and/or current applied to vary the amount of polymer deposited, such that a monolayer of particles of highly fluorinated polymer was deposited based on the desired amount of polymer and because discovering an optimum value of a result effective variable involves only routine skill in the art (see column 5, lines 60-64 of Kosuda).

Regarding claims 15-16, Zuber discloses that the highly fluorinated polymer may be PTFE (see column 7, lines 19-30).

Art Unit: 1771

Regarding claims 17-18, Zuber discloses that the carbon fiber construction may be a woven or nonwoven carbon fiber construction (column 4, lines 3-14).

3. Claims 10-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,972,735 to Breault in view of any one of USPN 3,573,991 to Lenfant or USPN 4,897,286 to Kosuda.

Regarding claims 10-16 and 19, Breault discloses a method of making a hydrophobic carbon fiber construction comprising the step of immersing a carbon fiber construction in an aqueous dispersion of highly fluorinated polymer (see the entire document including the paragraph bridging columns 2 and 3).

Although Breault fails to mention electrophoretically depositing the highly fluorinated polymer on the carbon fiber construction, Lenfant and Kosuda each disclose that it is known to contact particles with a counterelectrode and electrophoretically deposit the particles on a carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction (see entire documents including column 3, lines 65-75 of Lenfant and the paragraph bridging columns 5 and 6 of Kosuda). It would have been obvious to one having ordinary skill in the art at the time the invention was made to electrophoretically deposit the highly fluorinated polymer particles on the carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction.

Regarding claims 11, 13 and 19, Breault discloses that carbon fiber construction can be sintered (see the paragraph bridging columns 2 and 3).

Art Unit: 1771

Regarding claims 12-16 and 19, considering that the hydrophobic carbon fiber construction taught by the prior art is made by a method identical to the currently claimed method, it appears that the hydrophobic carbon fiber construction taught by the prior art inherently possesses a monolayer (as defined on page 3, lines 2-6 of the current specification) of particles of highly fluorinated polymer. In the event that it is shown that a monolayer does not exist, it would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the voltage and/or current applied to vary the amount of polymer deposited, such that a monolayer of particles of highly fluorinated polymer was deposited based on the desired amount of polymer and because discovering an optimum value of a result effective variable involves only routine skill in the art (see column 5, lines 60-64 of Kosuda).

Regarding claims 15-16, Breault discloses that the highly fluorinated polymer may be PTFE (see the paragraph bridging columns 2 and 3).

4. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 3,972,735 to Breault in view of any one of USPN 3,573,991 to Lenfant or USPN 4,897,286 to Kosuda as applied to claims 10-16 and 19 above, and further in view of USPN 6,803,143 to Zuber.

Breault is silent with regards to the specific carbon fiber constructions, therefore, it would have been necessary and thus obvious to look to the prior art for conventional constructions. Zuber provides this conventional teaching showing that it is known in the art to use woven or nonwoven carbon fiber constructions (column 4, lines 3-14) Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the

Art Unit: 1771

carbon fiber construction from a woven or nonwoven carbon fiber construction motivated by the expectation of successfully practicing the invention of Breault.

**(12) Response to Argument**

**Issue 1**

The appellant asserts that the examiner points to no teaching in any one of the cited references of a process which includes step c) recited in claim 1. The examiner contends that the cited prior art, in combination, rather than singularly, teaches the claimed step.

The appellant asserts that the examiner points to no teaching in any one of the cited references of a construction coated with a monolayer of particles of a highly fluorinated polymer. The examiner contends that the cited prior art, in combination, rather than singularly, teaches the claimed construction coated with a monolayer of particles of a highly fluorinated polymer.

**Regarding Claims 10-13**

While Zuber and the current specification clearly relate to fuel cells, the appellant asserts that Lenfant and Kosuda are nonanalogous art. The examiner respectfully disagrees. In response to applicant's argument that Lenfant and Kosuda are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

In the case of Lenfant, Lenfant is analogous art because it too relates to fuel cells (see title). Lenfant is also particularly pertinent to the particular problem with which the applicant was concerned, which is forming a uniform particle layer on a substrate surface. In the case of



Art Unit: 1771

Kosuda, Kosuda is analogous art because it is particularly pertinent to the particular problem with which the applicant was concerned, which is forming a uniform particle layer on a substrate surface. In addition, Kosuda specifically relates to forming a uniform particle layer on a carbon fiber substrate surface. Therefore, Lenfant and Kosuda are clearly analogous art.

Regarding claims 12-19

The appellant asserts that the applied prior art does not teach or suggest a “monolayer” of particles. The examiner respectfully disagrees. On page 3, lines 2-6 of the current specification, the appellant clearly defines what constitutes a monolayer. The specification defines a monolayer as (typically) a layer of particles on a surface that has a depth of not more than one particle over substantially all of the surface, and may optionally include a layer grown to a thicker depth than one particle if substantially all of the surface has first been covered with a layer of abutting particles having a depth of one particle.

Considering that the hydrophobic carbon fiber construction taught by the prior art is made by a method (electrophoresis) substantially identical to the currently claimed method, it appears that the hydrophobic carbon fiber construction taught by the prior art inherently possesses a monolayer of particles of highly fluorinated polymer. Kosuda even discloses that the process results in uniformly coated carbon fibers (column 4, lines 51-61). Considering that the appellant defined a uniform layer, regardless of particle thickness, as constituting a monolayer, it appears that the applied prior art teaches the claimed monolayer. The appellant has failed to show or attempt to show that the prior does not produce a monolayer of particles.

The appellant asserts that there is no motivation to combine Zuber with Lenfant or Kosuda. The examiner respectfully disagrees. Although Zuber fails to specifically mention

Art Unit: 1771

electrophoretically depositing the highly fluorinated polymer on the carbon fiber construction, Zuber discloses that a thickness of between 5 and 100 microns is desired because a thickness of below 5 microns results in an undesired “irregular” layer due to the underlying porosity (column 6, lines 55-61). Zuber discloses that an “irregular” layer results in an undesired reduction in conductivity (column 6, lines 55-61). Zuber clearly discloses that a monolayer (a layer that at least covers substantially all of the surface) is desired. Lenfant and Kosuda each disclose that it is known to contact particles with a counterelectrode and electrophoretically deposit the particles on a carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction (see entire documents including column 3, lines 65-75 of Lenfant and the paragraph bridging columns 5 and 6 of Kosuda). It would have been obvious to one having ordinary skill in the art at the time the invention was made to electrophoretically deposit the highly fluorinated polymer particles on the carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform coating on the carbon fiber construction.

## **Issue 2**

The appellant asserts that the examiner points to no teaching in any one of the cited references of a process which includes step c) recited in claim 1. The examiner contends that the cited prior art, in combination, rather than singularly, teaches the claimed step.

The appellant asserts that the examiner points to no teaching in any one of the cited references of a construction coated with a monolayer of particles of a highly fluorinated polymer.

Art Unit: 1771

The examiner contends that the cited prior art, in combination, rather than singularly, teaches the claimed construction coated with a monolayer of particles of a highly fluorinated polymer.

Regarding Claims 10-13

While Breault and the current specification clearly relate to fuel cells, the appellant asserts that Lenfant and Kosuda are nonanalogous art. The examiner respectfully disagrees. In response to applicant's argument that Lenfant and Kosuda are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

In the case of Lenfant, Lenfant is analogous art because it too relates to fuel cells (see title). Lenfant is also particularly pertinent to the particular problem with which the applicant was concerned, which is forming a uniform particle layer on a substrate surface. In the case of Kosuda, Kosuda is analogous art because it is particularly pertinent to the particular problem with which the applicant was concerned, which is forming a uniform particle layer on a substrate surface. In addition, Kosuda specifically relates to forming a uniform particle layer on a carbon fiber substrate surface. Therefore, Lenfant and Kosuda are clearly analogous art.

Regarding claims 12-19

The appellant asserts that the applied prior art does not teach or suggest a "monolayer" of particles. The examiner respectfully disagrees. On page 3, lines 2-6 of the current specification, the appellant clearly defines what constitutes a monolayer. The specification defines a monolayer as (typically) a layer of particles on a surface that has a depth of not more than one

Art Unit: 1771

particle over substantially all of the surface, and may optionally include a layer grown to a thicker depth than one particle if substantially all of the surface has first been covered with a layer of abutting particles having a depth of one particle.

Considering that the hydrophobic carbon fiber construction taught by the prior art is made by a method (electrophoresis) substantially identical to the currently claimed method, it appears that the hydrophobic carbon fiber construction taught by the prior art inherently possesses a monolayer of particles of highly fluorinated polymer. Kosuda even discloses that the process results in uniformly coated carbon fibers (column 4, lines 51-61). Considering that the appellant defined a uniform layer, regardless of particle thickness, as constituting a monolayer, it appears that the applied prior art teaches the claimed monolayer. The appellant has failed to show or attempt to show that the prior does not produce a monolayer of particles.

The appellant asserts that there is no motivation to combine Breault with Lenfant or Kosuda. The examiner respectfully disagrees. Although Breault fails to mention electrophoretically depositing the highly fluorinated polymer on the carbon fiber construction, Breault discloses that a smooth surface is desired because a smooth surface allows for an electrode to be formed with very low catalyst loadings (column 2, lines 23-26). Lenfant and Kosuda each disclose that it is known to contact particles with a counterelectrode and electrophoretically deposit the particles on a carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a uniform (smooth) coating on the carbon fiber construction (see entire documents including column 3, lines 65-75 of Lenfant and the paragraph bridging columns 5 and 6 of Kosuda). It would have been obvious to one having ordinary skill in the art at the time the invention was made to

Art Unit: 1771

electrophoretically deposit the highly fluorinated polymer particles on the carbon fiber construction by applying an electric current between the carbon fiber construction and the counterelectrode to ensure a smooth coating on the carbon fiber construction.

**Issue 3**



The appellant refers back to previous arguments. The appellant fails to set forth a separate argument against the cited rejection.


For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

  
**ANDREW T. PIZIALI**  
**PATENT EXAMINER**

atp  
July 28, 2005

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